

Amendments to the Claims

Please amend Claims 1, 3, 9, 12, 15, 20 and 24. The Claim listing below will replace all prior versions of the claims in the application.

Claim Listing

1. (Currently Amended) An apparatus comprising:
 - an intermediate device to be coupled between a storage protocol controller and at least one storage device, and capable of communicating in accordance with a plurality of storage protocols, and including,
 - protocol sensing circuitry to determine based on an initialization signal sequence indicative of a storage protocol received from the at least one storage device which one of-a the plurality of storage protocols is associated with via which the at least one storage device to be coupled to the intermediate device is capable of communicating, and
 - flow control circuitry to control a data stream between the at least one storage device and the storage protocol controller, wherein the data stream includes the storage protocol determined by the protocol sensing circuitry.
2. Canceled.
3. (Currently Amended) The apparatus of claim 1, wherein:
the predetermined initialization signal sequence comprises an out-of-band signal sequence.
4. (Previously Presented) The apparatus of claim 1, wherein:
the protocol sensing circuitry is also capable of receiving at least one of an out-of-band signal sequence and an analog burst signal sequence, and the flow control circuitry comprises data tracking circuitry capable of receiving a data stream from said at least one storage device and also capable of generating a clock signal indicative of the frequency of

said data stream, said flow control circuitry also comprising retimer circuitry capable of receiving said data stream and said clock signal and generating a retimed data stream.

5. (Previously Presented) The apparatus of claim 1, wherein:
the intermediate device is capable of being coupled, via at least one cable, to said at least one storage device.
6. (Previously Presented) The apparatus of claim 1, wherein:
the plurality of different storage protocols comprise a Fibre Channel protocol, a Serial Attached Small Computer System Interface protocol, and a Serial Advanced Technology Attachment protocol.
7. (Previously Presented) The apparatus of claim 1, wherein:
the intermediate device is capable of being coupled to a cable compatible with at least one of said storage protocols.
8. (Previously Presented) The apparatus of claim 1, wherein:
the intermediate device further comprises protocol control circuitry capable of receiving a signal from said at least one storage device and, in response at least in part thereto, generating an acknowledge signal to be transmitted to said at least one storage device.
9. (Currently Amended) A system, comprising:
at least one storage protocol controller capable of communicating in accordance with a plurality of storage protocols, the ~~a~~ at least one storage protocol controller being capable of being coupled with a bus;
a storage enclosure including a plurality of storage devices, wherein two or more of the storage devices are combined in a Redundant Array of Inexpensive Disk (RAID) configuration, and each storage device is capable of communicating in accordance with one of Serial Attached SCSI (SAS), Serial Advanced Technology Attachment (SATA) and Fibre Channel (FC) storage protocol;

an intermediate device coupled between the storage protocol controller and at least one of the plurality of storage devices the storage enclosure, and capable of communicating in accordance with a plurality of storage protocols, and including,

protocol sensing circuitry to determine based on an initialization signal sequence indicative of a storage protocol received from the at least one of the storage devices in the storage enclosure storage device which one of the plurality of storage protocols is associated with via which the at least one storage device to be coupled to the intermediate device is capable of communicating, and

flow control circuitry to control a data stream between the at least one storage device and the storage protocol controller, wherein the data stream includes the storage protocol determined by the protocol sensing circuitry.

10. (Previously Presented) The system of claim 9, wherein:
the intermediate device is coupled to said storage protocol controller and said at least one of the plurality of storage devices via one or more cables.
11. Canceled.
12. (Currently Amended) The system of claim 9, wherein:
the predetermined initialization signal sequence comprises an out-of-band signal sequence.
13. (Previously Presented) The system of claim 9, wherein:
the intermediate device is further capable of controlling said data stream to produce a retimed data stream, and transmitting the retimed data stream to at least one of the at least one storage protocol controller and the at least one of the plurality of storage devices.
14. (Previously Presented) The system of claim 9, wherein:
the plurality of different storage protocols comprise a Fibre Channel protocol, a Serial Attached Small Computer System Interface protocol, and a Serial Advanced Technology Attachment protocol.

15. (Currently Amended) A method comprising:

determining, at least in part, by an intermediate device supporting a plurality of storage protocols, based on an initialization signal sequence indicative of a storage protocol received from at least one storage device which one of the plurality of storage protocols is associated with via which said at least one storage device coupled with the intermediate device is capable of communicating; and

controlling, at least in part by the intermediate device, at least one data stream being communicated in accordance with the one storage protocol from said at least one storage device to a storage protocol controller.

16. (Original) The method of claim 15, further comprising:

retiming, by the intermediate device, said at least one data stream generated by said at least one storage device.

17. Canceled.

18. (Previously Presented) The method of claim 15, further comprising:

determining, by the intermediate device, a link frequency associated with said at least one storage device; and

communicating, by said intermediate device with said at least one storage device using said link frequency.

19. (Previously Presented) The method of claim 15, further comprising:

communicating, by the intermediate device with said at least one storage device with a selected storage protocol among the plurality of storage protocols.

20. (Currently Amended) An article comprising:

a storage medium having stored thereon instructions that when executed by a machine result in the following operations:

determining, at least in part, by an intermediate device supporting a plurality of storage protocols based on an initialization signal sequence indicative of a storage protocol received from a storage device, which one of the plurality of storage protocols is associated with via which the at least one storage device coupled with the intermediate device is capable of communicating; and

controlling, at least in part by the intermediate device, at least one data stream being communicated in accordance with the one storage protocol from said at least one storage device to a storage protocol controller.

21. (Original) The article of claim 20, further comprising the following operations:
retiming, by the intermediate device, said at least one data stream generated by said at least one storage device.
22. Canceled.
23. (Previously Presented) The article of claim 20, further comprising the following operations:
determining, by the intermediate device, a link frequency associated with said at least one storage device; and
communicating, by said intermediate device with said at least one storage device using said link frequency.
24. (Currently Amended) The article of claim 20, further comprising the following operations:
communicating, by the intermediate device with said at least one storage device with a selected predetermined storage protocol among the plurality of storage protocols.
25. (Previously Presented) The apparatus of claim 1, wherein the flow control circuitry is configured to transmit a hold request to the storage protocol controller in response to receiving a hold request from one of the storage devices indicating that a receive buffer of the one of the storage devices is filled above a threshold level and further configured to

transmit an acknowledgement signal back to the one of the storage devices in response thereto.

26. (Previously Presented) The system of claim 9, wherein the flow control circuitry is configured to transmit a hold request to the storage protocol controller in response to receiving a hold request from one of the storage devices indicating that a receive buffer of the one of the storage devices is filled above a threshold level and further configured to transmit an acknowledgement signal back to the one of the storage devices in response thereto.
27. (Previously Presented) The method of claim 15, further comprising:
 - transmitting a first hold request from the intermediate device to the storage protocol controller in response to receiving a second hold request from the at least one storage device, the second hold request indicating that a receive buffer of the at least one storage device is full or almost full; and
 - transmitting an acknowledgement signal from the intermediate device back to the at least one storage device in response to receiving the first hold request.
28. (Previously Presented) The article of claim 20, further comprising:
 - transmitting a first hold request from the intermediate device to the storage protocol controller in response to receiving a second hold request from said at least one storage device, the second hold request indicating that a receive buffer of said at least one storage device is full or almost full; and
 - transmitting an acknowledgement signal from the intermediate device back to said at least one storage device in response to receiving the first hold request.
29. (New) The apparatus of claim 1, wherein the storage protocol controller is a multi-protocol initiator engine and the at least one storage device is a target storage device